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User instructions Compound laboratory microscope

KERN

OBF, OBL

OBF121, OBF122, OBF123, OBL125, OBL127

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User instructions

Compound microscopes

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1 Before use

1.1 General notes

You must open the packaging carefully, to make sure that none of the accessories in the packaging fall on the floor and get broken.

In general, microscopes should always be handled carefully because they are sensitive precision instruments. When using or transporting the microscope it is particularly important to avoid abrupt movements, as this may damage the optical components.

You should also avoid getting dirt or finger prints on the lens surface, because in most cases this will reduce image clarity.

To maintain the performance of the microscope, it must never be disassembled. So components such as lenses and other optical elements should be left as they were before use. Also the electrical parts in the base of the device must not be tampered with, as in this area there is an additional risk of triggering an electric shock.

1.2 Notes on the electrical system

Before connecting to a mains power supply, you must make sure that you are using the correct input voltage. The information to select the correct mains cable is located on each device, on the rear of the product directly above the connection socket. You must comply with this information. If you do not comply with these specifications, then fires or other damage to the device could occur.

The main switch must also be switched off before the mains cable is connected. In this way you will avoid triggering an electric shock.

If you are using an extension cable, then the mains cable you use must be earthed.

If the original fuse should blow, it must only be replaced by an appropriate fuse. Suitable replacement fuses are included with the delivery.

When carrying out any procedures whereby you come into contact with the electrical system of the device, such as, for example, changing the bulb or fuse, only carry out these procedures when the power is disconnected.

Under no circumstances should you touch the integrated halogen bulbs or housings either during operation or directly after use. These bulbs produce significant heat and therefore there is a risk that the user could be severely burnt. So before handling the bulbs, you must check that they have cooled down.

1.3 Storage

You should ensure that the device is not exposed to direct sunlight, temperatures which are too high or too low, vibrations, dust or a high level of humidity.

The ideal temperature range is between 0 and 40°C and a relative humidity of 85% should not be exceeded.

The device should always be located on a rigid, smooth, horizontal surface.

When the microscope is not being used, you should fit the lens cap and cover the microscope with the enclosed dust protective cover. If the eyepieces are being stored separately, the protective caps must be fitted to the lens barrels. In most cases, if dust and dirt gets inside the optical unit of a microscope this can cause irreversible errors or damage.

The best way to store accessories which consist of optical elements, such as, for example, eyepieces and lenses, is in a dry box with desiccant.

1.4 Maintenance and cleaning

In any event, the device must be kept clean and dusted regularly.
If any moisture should be occur, before you wipe down the device you must ensure that the mains power is switched off.

When glass components become dirty, the best way to clean them is to wipe them gently with a gauze cloth.

To wipe oil stains or finger prints off the lens surface, moisten the gauze cloth with a mixture of ether and alcohol (70 / 30 ratio) and use this to clean the lens.

You must be careful when handling ether and alcohol, as these are highly flammable substances. You must therefore keep it away from naked flames and electrical devices which can be switched on and off, and only use it in well-ventilated rooms.

However organic solutions of this type should not be used to clean other components of the device. This could lead to damage to the paint finish. To do this, it is sufficient to use a neutral cleaning product.

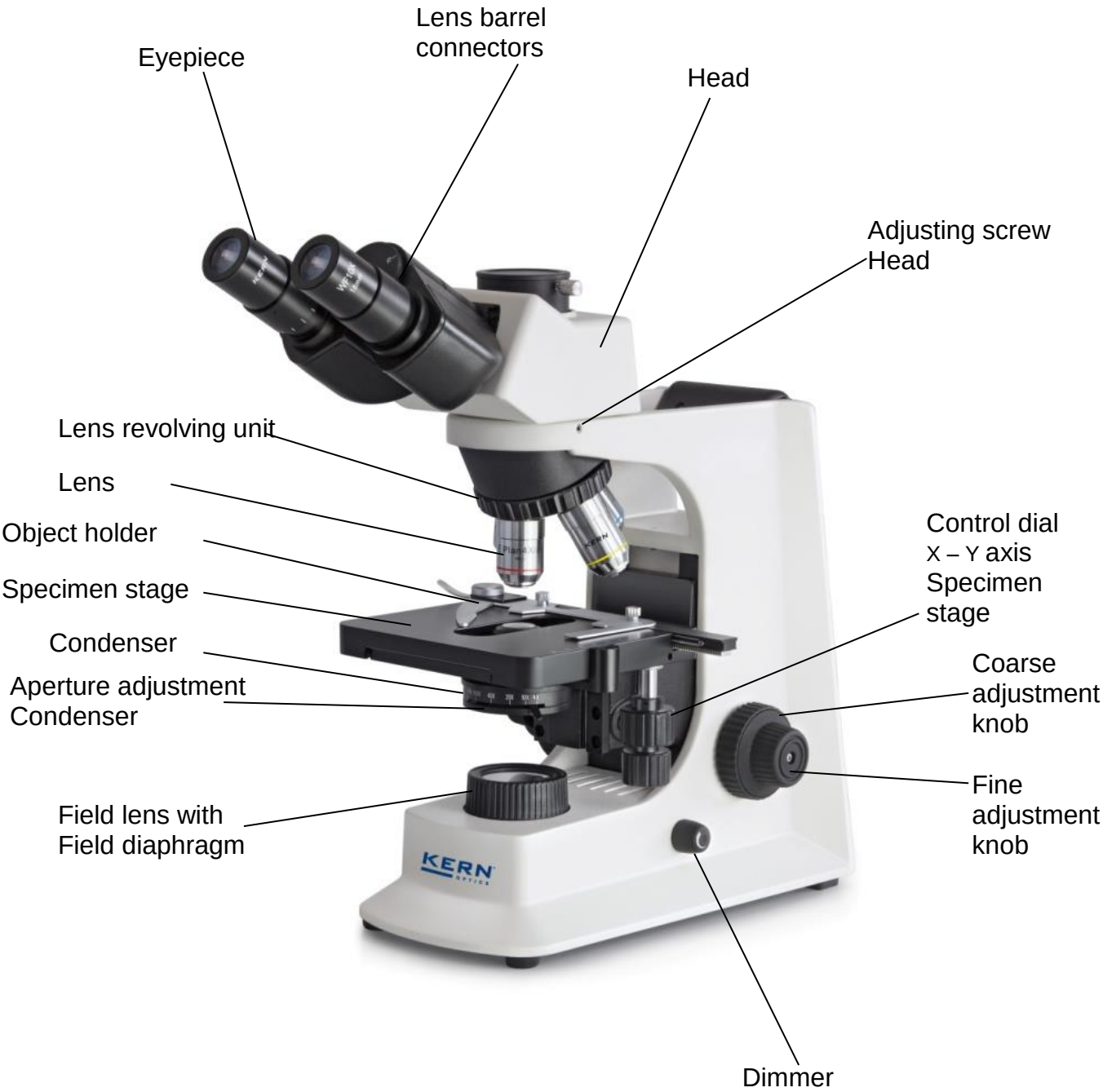
You could also use the following cleaning products to clean the optical components:

- Special cleaner for optical lenses
- Special optical cleaning cloths
- Bellows
- Brush

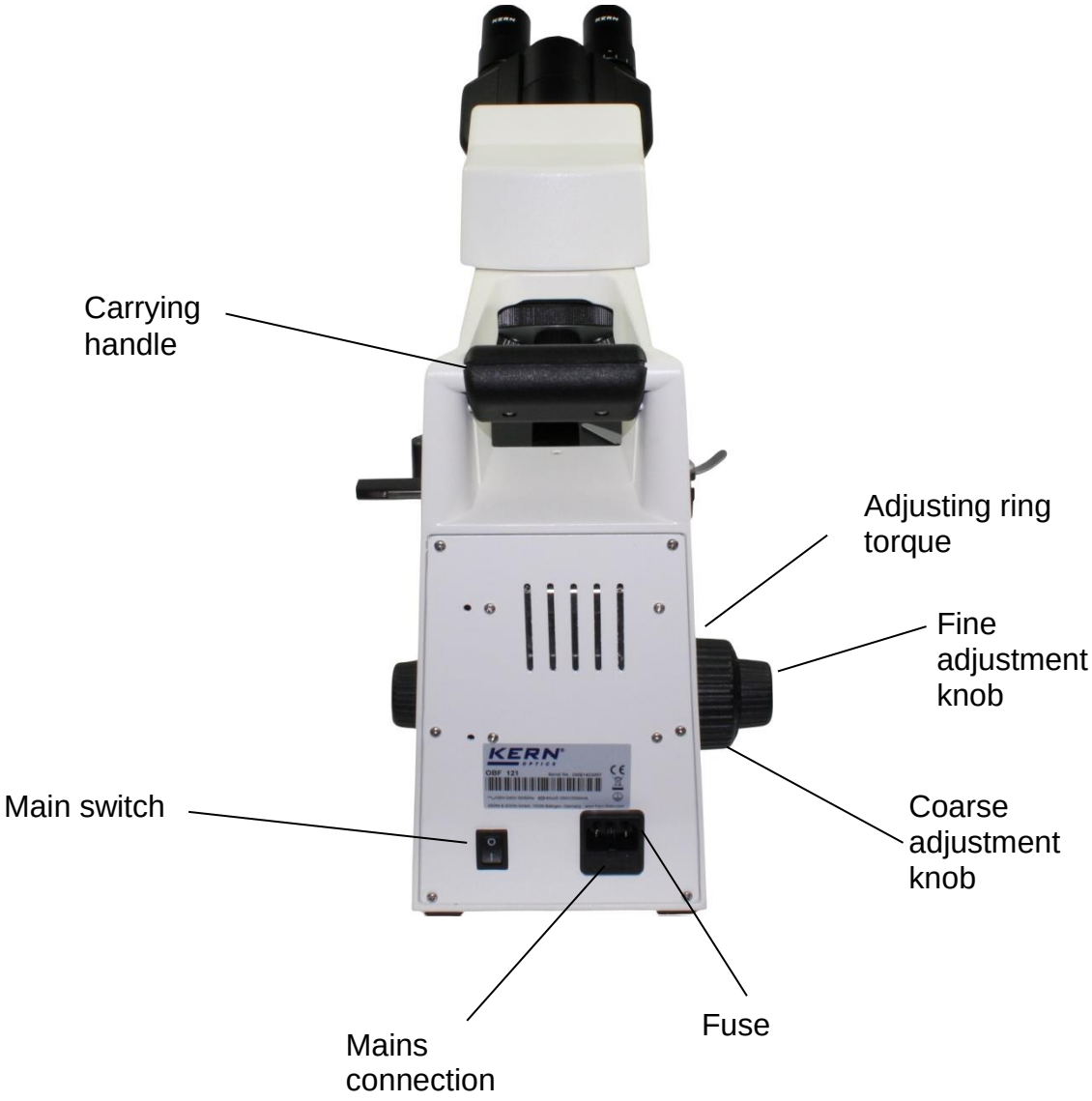
When handled correctly and checked regularly, the microscope should give many years of efficient service.

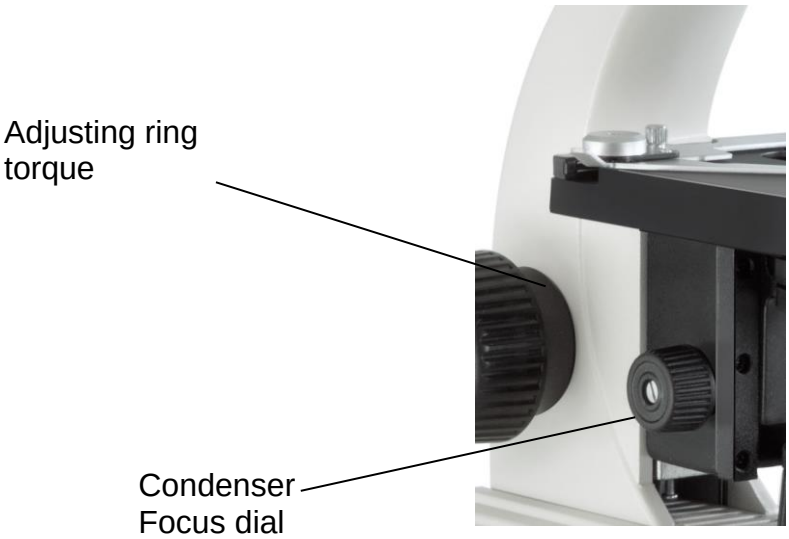
Should repairs still be necessary, please contact your KERN dealer or our Technical Department.

2 Nomenclature



Rear view


Carrying handle
Adjusting ring torque
Fine adjustment knob
Main switch
Coarse adjustment knob
Mains connection
Fuse


Adjusting ring torque
Condenser Focus dial

3 Technical data / model outfit

Model KERN	Standard configuration		
	Optical system	Tube	Illumination
OBF 121	Achromatic	Binocular	6V / 20W Halogen (transmitting)
OBF 122	Achromatic	Binocular	6V / 20W Halogen (transmitting)
OBF 123	Achromatic	Binocular	3W LED (transmitting)
OBL 125	Infinity	Binocular	6V / 20W Halogen (transmitting)
OBL 127	Infinity	Binocular	3W LED (transmitting)

Model outfit		**Model KERN**			**Order number**
		OBF 121	**OBF 122**	**OBF 123**	
Eyepieces	WF 10x / Ø 18 mm	●●	●●	●●	OBB-A1347
	WF 16x / Ø 13 mm	○○	○○	○○	OBB-A1354
	WF 10x / Ø 18 mm (reticule 0,1 mm) (non-adjustable)	○	○	○	OBB-A1349
	WF 10x / Ø 18 mm (reticule 0,1 mm) (adjustable)	○	○	○	OBB-A1350
	WF 10x / Ø 20 mm (reticule 0,1 mm) (adjustable)	○	○	○	OBB-A1352
Achromatic objectives	4x / 0,10	●			OBB-A1111
	10x / 0,25	●			OBB-A1108
	40x / 0,65 (spring)	●			OBB-A1112
	100x / 1,25 (oil) (spring)	●			OBB-A1109
	20x / 0,40	○	○	○	OBB-A1110
	60x / 0,80 (spring)	○	○	○	OBB-A1113
Plan objectives	4x / 0,10		●	●	OBB-A1255
	10x / 0,25		●	●	OBB-A1238
	40x / 0,65 (spring)		●	●	OBB-A1256
	100x / 1,25 (oil) (spring)		●	●	OBB-A1239
	20x / 0,40		○	○	OBB-A1249
	60x / 0,80 (spring)		○	○	OBB-A1269
Binocular tube	· Siedentopf, 30° inclined, 360° rotatable · Interpupillary distance: 50 – 75 mm (for non-infinity system) · With diopter adjustment (one-sided)	●	●	●	OBB-A1129
Trinocular tube	· Siedentopf, 30° inclined, 360° rotatable · Interpupillary distance: 50 – 75 mm · Light distribution: 20:80 (for non-infinity system) · With diopter adjustment (one-sided)	○	○	○	OBB-A1345
Nosepiece	Quadplex	●	●	●	
Mechanical stage	· Stage size: WxD 145x140 mm · Travel: 76x52 mm · Coaxial coarse and fine focusing knobs, scale: 2 µm · Two slide holder	●	●	●	
Condenser	Abbe N.A. 1,25 precentered (aperture diaphragm)	●	●	●	OBB-A1103
Illumination	6V / 20W Halogen (transmitting)	●	●		OBB-A1307
	3W LED illumination system (transmitting) (non-rechargeable)			●	
Field diaphragm	Field diaphragm	●	●	●	
Darkfield unit	N.A. 0,9 (Dry) Usable for 4x – 40x objectives	○	○	○	OBB-A1149
Polarising unit	Analyser / Polariser	○	○	○	OBB-A1277
Fluorescence unit	100W HBO Epi Fluorescence unit, three-hole slide (B / G) including centering objective	○	○	○	OBB-A1154
	3W LED Epi Fluorescence unit, three-hole slide (B / G) including centering objective	○	○	○	OBB-A1157
Filter	Blue	●	●	●	OBB-A1178
	Green	○	○	○	OBB-A1194
	Yellow	○	○	○	OBB-A1203
C-Mount	0,47x (focus adjustable)	○	○	○	OBB-A1135
	1x	○	○	○	OBB-A1142

● = Standard configuration ○ = Option

Model outfit		Model KERN		Order number
		OBL 125	OBL 127	
Eyepieces	WF 10x / Ø 20 mm	●●	●●	OBB-A1351
	WF 16x / Ø 13 mm	○○	○○	OBB-A1354
	WF 10x / Ø 18 mm (reticule 0,1 mm)	○	○	OBB-A1349
	WF 10x / Ø 18 mm (reticule 0,1 mm) (adjustable)	○	○	OBB-A1350
	WF 10x / Ø 20 mm (reticule 0,1 mm) (adjustable)	○	○	OBB-A1352
Infinity E-Plan objectives	4x / 0,10	●	●	OBB-A1161
	10x / 0,25	●	●	OBB-A1159
	40x / 0,65 (spring)	●	●	OBB-A1160
	100x / 1,25 (oil) (spring)	●	●	OBB-A1158
	Plan 20x / 0,40	○	○	OBB-A1250
	Plan 60x / 0,80 (spring)	○	○	OBB-A1270
Binocular tube	· Siedentopf, 30° inclined, 360° rotatable · Interpupillary distance: 50 – 75 mm (for infinity system) · With diopter adjustment (one-sided)	●	●	OBB-A1130
Trinocular tube	· Siedentopf, 30° inclined, 360° rotatable · Interpupillary distance: 50 – 75 mm · Light distribution: 20:80 (for infinity system) · With diopter adjustment (one-sided)	○	○	OBB-A1346
Nosepiece	Quadplex	●	●	
Mechanical stage	· Stage size: WxD 145x140 mm · Travel: 76x52 mm · Coaxial coarse and fine focusing knobs, scale: 2 µm · Two slide holder	●	●	
Condenser	Abbe N.A. 1,25 precentered (aperture diaphragm)	●	●	OBB-A1103
Illumination	6V / 20W Halogen (transmitting)	●		OBB-A1370
	3W LED illumination system (transmitting) (non-rechargeable)		●	
Field diaphragm	Field diaphragm	●	●	
Darkfield unit	N.A. 0,9 (Dry) Usable for 4x – 40x objectives	○	○	OBB-A1149
Polarising unit	Analyser / Polariser	○	○	OBB-A1277
Independent phase contrast unit (including PH-condenser and PH-slides)	Independent slot with ∞ PH-Plan objective 10x	○	○	OBB-A1215
	Independent slot with ∞ PH-Plan objective 20x	○	○	OBB-A1217
	Independent slot with ∞ PH-Plan objective 40x	○	○	OBB-A1219
	Independent slot with ∞ PH-Plan objective 100x	○	○	OBB-A1213
Fluorescence unit	100W HBO Epi Fluorescence unit, three-hole slide (B / G) including centering objective	○	○	OBB-A1154
	3W LED Epi Fluorescence unit, three-hole slide (B / G) including centering objective	○	○	OBB-A1157
Filter	Blue	●	●	OBB-A1178
	Green	○	○	OBB-A1194
	Yellow	○	○	OBB-A1203
C-Mount	0,47x (focus adjustable)	○	○	OBB-A1135
	1x	○	○	OBB-A1142

● = Standard configuration ○ = Option

4 Assembly

4.1 Lenses

The specimen stage must be in its lowest position so that the lenses can be screwed into the lens revolving unit. The lenses are screwed in so that when you turn the revolving unit, the next lens for stronger magnification moves into position. Please make sure that you do not touch the lenses with your fingers and that no dust enters the apertures. For lenses which are marked “OIL”, you must use an immersion oil with the lowest level of inherent fluorescence.

4.2 Condenser

Move the specimen stage to the upper position. Use the focus dial of the condenser to move the condenser holder to the central position. Fit the condenser into the condenser holder from below, and fix with the adjusting screw. When doing this, you should be able to read the scale from the front. Please do not touch the optical lenses with your fingers.

4.3 Head

Undo fixing screw.
Insert the round dovetail bracket on the head into the round dovetail bracket in the housing and tighten with the fixing screw. Please make sure that you do not touch the lenses with your fingers and that no dust enters the apertures.

4.4 Eyepieces

For each eye, use an eyepiece with the same magnification. Remove the plastic protective caps and insert both eyepieces. They are not fixed with a screw, but are just inserted. Please make sure that you do not touch the lenses with your fingers and that no dust enters the apertures.

5 Operation

5.1 Getting started

Plug the **mains plug** into the socket and plug the cold device plug into the device. Set the **dimmer** to the lowest level. Switch on the **main switch**.

5.2 Adjust the gap between the eyes:

Different users have different gaps between the eyes. So each time a different person uses the microscope, the gap between the two eyepieces must be re-adjusted. While you are looking through the eyepieces, use one hand to hold the right or left lens barrel firmly. By pulling them apart or pushing them together, you can either increase or reduce the gap between the eyes. As soon as the left and right visual fields fully overlap each other (only one circular image is visible), this is the correct gap between the eyes.

5.3 Adjusting the magnification

Select the **lens** with the lowest magnification and make sure that the lens revolving unit is properly clicked into place.

Place the **test object** on the specimen stage and fix it with the object holder, if necessary.
Use the control dial for the **X-Y axis specimen stage** to position the sample in the correct place (central under the middle of the lens).

Carefully raise the specimen stage using the **coarse adjustment knob**, until the slide is almost touching the lens (observe from the side). The lens must not touch the object holder (risk of glass breakage).

Look through the **eyepieces** and use the coarse adjustment knob to lower it slowly until the object is visible. If necessary, adjust the brightness by adjusting the bulb (potentiometer). Avoid overexposure.

Now use the **fine adjustment knob** to adjust the focus. For slides with low contrast or a small number of objects, for example individual cells, we recommend that you use a high-contrast standard slide to help you to make the adjustment to find the correct level.

Once you have found a point which must be observed more closely, this must be adjusted to be in the middle of the visual field (**x/y adjustment of the stage**). To be able to view the required section of the object, this section must be positioned centrally under the lens.

5.4 Adjust the brightness

Adjust the condenser aperture
Close the field diaphragm in the base either completely or almost completely. When you look in the microscope a blurred image appears in the aperture.

Adjust the height of the condenser until the image from the field diaphragm appears clearly in the visual field. For some microscopes there is a risk that you will lift the condenser up so high that it collides with the object holder. Care is needed when doing this.

Adjust the field diaphragm using the field diaphragm adjusting ring. Open the field diaphragm until it just disappears out of the visual field.

For each slide, use the **aperture diaphragm** of the condenser to find the very best compromise between contrast and brightness for the microscopic image. The scale on the condenser is to be regarded as a recommendation for each lens.

It is possible to alter the brightness of the bulb using the **dimmer**. The brightness is always controlled by the bulb brightness and not by the field diaphragm.

It is possible to re-adjust the focus and x-y axis.

Observe the object.

5.5 Dioptre compensation and focussing

For models with **dioptre setting**:
Keep the eye on the fixed, non-adjustable lens barrel open and close the eye which is on the adjustable lens barrel. Then adjust the focus for the open eye using the fine adjustment knob. Then open the other eye and shut the eye which had been open. Then adjust the focus for the second eye on the dioptre setting. When doing this, do not touch the fine adjustment knob.

If necessary, **alter the brake action for the control knobs** using the locking ring. The rotary knobs on the lefthand side are connected to the rotary knobs on the righthand side. Please only rotate on one side at a time, do not rotate right and left at the same time in opposite directions, otherwise this will damage the drive.

Using **eye cups**:
If eyepieces with a high eye point (particularly suitable for those who wear glasses) are used, then it may also be useful for users who don’t wear glasses, to fit eye cups to the eyepieces.

These special eyepieces are also called **High Eye Point eyepieces**. They can be identified by the **glasses symbol** on the side.

Eye cups

High Eye Point eyepieces identified by the glasses symbol

When doing this make sure that the dioptre setting is not moved. We would therefore advise that you hold the dioptre compensation ring on an eyepiece with one hand while you fit the eye cup with the other. Before using the microscope, users who wear glasses must remove the eye cups, which you may find on High Eye Point eyepieces. Make sure that you maintain the hygienic cleanliness of the eye cups.

Turning the lens revolving unit will bring the lens with the **next magnification level** into position. Make sure that the lens clicks properly into place. When rotating the lenses, check from the side to make sure that the glass holder does not get damaged by the lens. Under normal conditions you should be able to select the next lens immediately and the focus should be roughly at the same level. Make additional adjustments with the fine adjustment knob. If when you rotate the lens it hits the object holder, you must first lower the specimen stage and re-adjust it. For lenses which work with oil immersion (these are marked with the word “oil”), first put the oil drops on the slide, bring the lens into position and move it closer to the object holder. The link between the object holder and lens is the oil. After use or before changing the slide, remove the oil using a dust-free cloth.

6 Storage

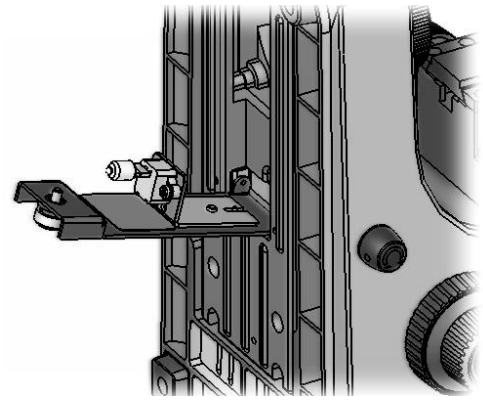
It is important that the microscope is covered with the enclosed protective cover after each use. In the long term, this is the only way to protect it from getting dirty. Ideally the microscope will be used in an air-conditioned room. If the microscope is not used for several days, then we would recommend that it is stored in a cupboard with its protective cover. Dust and moisture are the greatest enemies of the microscope.

7 Maintenance

In general, these microscopes are maintenance-free. Service procedures should be limited to replacing bulbs, light sources and electrical fuses. Should a defect occur, please contact your dealer or KERN Service.

7.1 Changing the bulb

Switch the device off and unplug it. Unscrew the cover on the rear of the device and open it up. Wait until the bulb has cooled down (halogen bulb). Remove old bulb. Please use cloth gloves to hold and fit the new bulb otherwise grease and dust on the surface of the bulb could affect its brightness and service life.



7.2 Changing the fuse

Switch the device off and unplug it. Pull out the fuse housing under the mains cable socket, remove the old fuse and fit a new fuse. Push the fuse housing back in.

8 Trouble shooting

Problem	Possible causes
The bulb does not light	The mains plug is not correctly plugged in
	There is no power at the socket
	Defective bulb
	Defective fuse
The bulb blows immediately	The specified bulb or fuse has not been used.
The visual field is dark	The aperture diaphragm and/or field diaphragm are not opened wide enough.
	The selector switch for the beam path is set to “Camera”.
You cannot adjust the brightness	The brightness control has been set incorrectly
	The condenser has not been correctly centred.
	The condenser is too low.
The visual field is dark or is not correctly illuminated.	The lens has not been correctly adjusted
	The selector switch for the beam path is between two settings.
	The object revolving unit is not correctly fitted.
	The condenser is not correctly fitted.
	A lens is being used which doesn’t match the lighting area of the condenser.
	The field diaphragm is closed too tightly.
	The bulb is not correctly fitted.
The visual field of one eye does not match that of the other eye.	The gap between the eyes is not correctly adjusted.
	Dioptre setting has not been carried out correctly.
	Different eyepieces are used for the right and left side.
	The eyes are not used to using a microscope.

Blurred details Bad image Bad contrast Vignetted visual field	The aperture diaphragm is not opened wide enough.
	The condenser is too low.
	The lens does not belong to this microscope
	The front lens of the lens unit is dirty
	An immersion object has been used without immersion oil
	The immersion oil contains air bubbles
	The recommended immersion oil has not been used.
	Dirt / dust on the lens
	Dirt /dust on the front lens of the condenser.
Dirt or dust in the visual field	Dirt / dust on the eyepieces
	Dirt / dust on the front lens of the condenser.
	Dirt / dust on the object.
One side of the image is blurred	The stage has not been assembled correctly.
	The lens is not positioned correctly on the beam path.
	The lens revolving unit is not correctly fitted.
	The upper side of the object is facing down.
The image flickers	The lens revolving unit is not correctly fitted
	The lens is not positioned correctly on the beam path.
The coarse adjustment knob is difficult to turn	The rotational resistance brake is overtightened.
	The angle table is blocked by a solid body.
The stage moves down on its own. The fine adjustment knob moves on its own	The rotational resistance brake is not tight enough.
When you move the table, the image becomes blurred	The stage was not correctly fitted

9 Service

If, after studying the user manual, you still have questions about commissioning or using the microscope, or if unforeseen problems should arise, please get in touch with your dealer. The device may only be opened by trained service engineers who have been authorised by KERN.

10 Disposal

The packaging is made of environmentally-friendly materials, which you can dispose of at your local recycling centre. Disposal of the storage box and device must be carried out by the operator in accordance with all national or regional laws in force in the location of use.

11 Further information

The illustrations may differ slightly from the product.

The descriptions and illustrations in this user manual are **subject to change without notice**. **Further developments** on the device may lead to these changes.

All language versions contain a non-binding translation. The original German document is the binding version.

NOTES